EXHIBIT A

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571-272-7822
Paper 35
Date: May 12, 2020

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LURACO HEALTH & BEAUTY, LLC,
Petitioner,

v.

LEXOR MANUFACTURING, LLC,
Patent Owner.

IPR2019-00204
Patent RE46,655 E

Before MEREDITH C. PETRAVICK, RICHARD H. MARSCHALL, and ALYSSA A. FINAMORE, *Administrative Patent Judges*.

MARSCHALL, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining No Challenged Claims Unpatentable
35 U.S.C. § 318(a)

INTRODUCTION

Luraco Health & Beauty, LLC ("Petitioner") filed a Petition (Paper 1, "Pet.") requesting institution of an *inter partes* review of claims 4–74 of U.S. Patent No. RE46,655 E (Ex. 1001, "the '655 patent"). Lexor Manufacturing, LLC ("Patent Owner") filed a Preliminary Response. Paper 5. Pursuant to 35 U.S.C. § 314, we instituted an *inter partes* review of claims 4–74 of the '655 patent on all presented challenges. Paper 12. After institution, Patent Owner filed a Corrected Response (Paper 21, "PO Resp."), to which Petitioner filed a Reply (Paper 27, "Pet. Reply"), and Patent Owner filed a Sur-reply (Paper 28, "PO Sur-reply"). An oral hearing in this proceeding was held on February 12, 2020; a transcript of the hearing is included in the record (Paper 34, "Tr.").

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine that Petitioner has not shown by a preponderance of the evidence that any of claims 4–74 of the '655 patent are unpatentable.

BACKGROUND

A. Real Parties in Interest

Petitioner states that its real parties in interest are itself and Luraco, Inc. Pet. 1. Patent Owner states that it is the sole real party in interest. Paper 4, 2.

B. Related Matters

The parties indicate that the '655 patent has been asserted in *Luxor Manufacturing, LLC v. Luraco, Inc. & Luraco Health Beauty, LLC.*, No. 3-18-cv-01933-N (N.D. Tex. filed July 27, 2018). Pet. 1; Paper 4, 2.

C. The '655 Patent

The '655 patent was reissued on January 2, 2018, from a reissue application filed on July 30, 2015. Ex. 1001, code (22), (45). The '655 patent "relates to a water jet mechanism and method of use in a pedicure and more particularly, to a motor in a housing having a cap." *Id.* at 1:34–36. Figures 3 and 5 of the '655 patent are reproduced below.

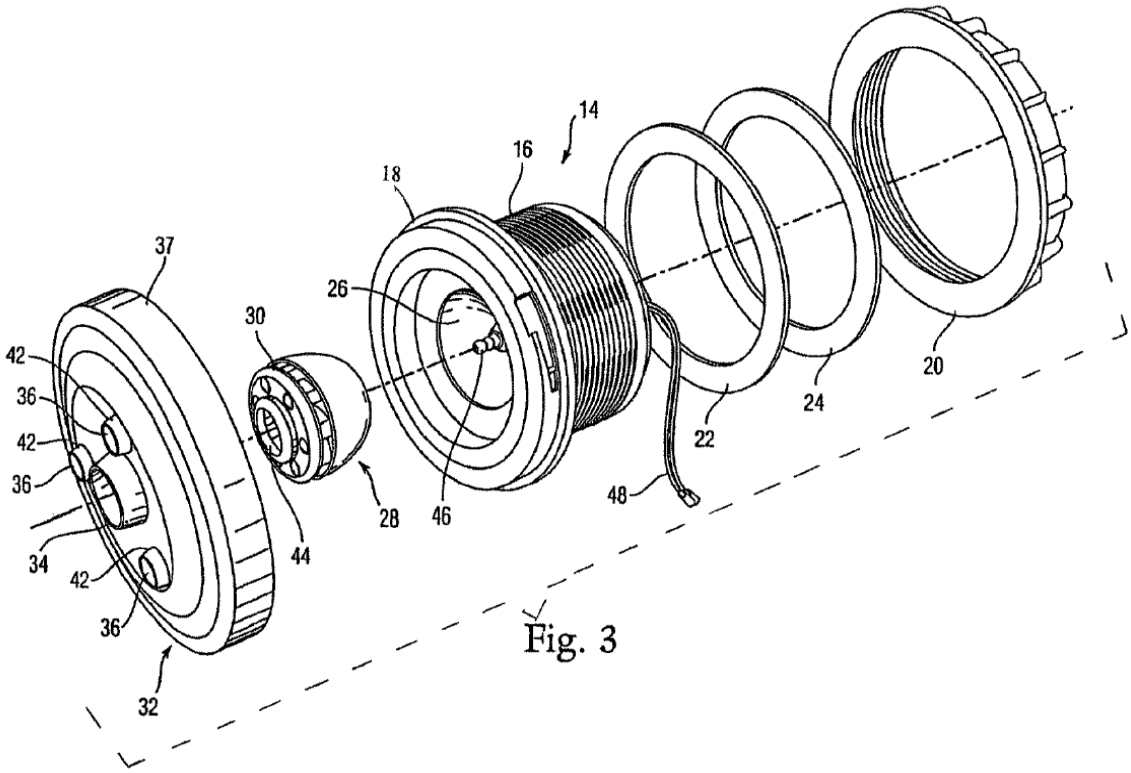

Fig. 3

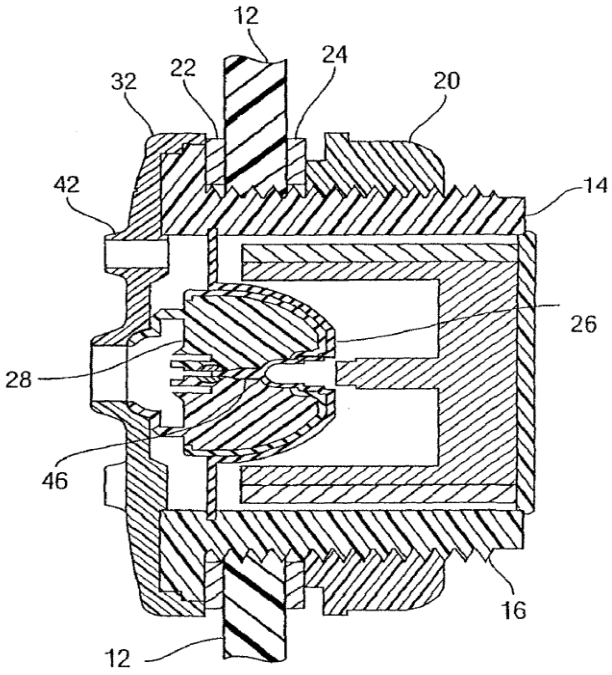

Fig. 5

Figure 3 is "an exploded view of the . . . invention" of the '655 patent. Ex. 1001, 3:14. Figure 5 is "a cross section view showing the mounting of the housing in the basin." *Id.* at 3:17–18. The following parts of the jet pump are depicted in Figure 3 (moving from left to right): cap 32; rotor 28 with vanes 30; housing 14 with enlarged shoulder 18, stator 26, and threads 16; seal rings 22, 24; and screw ring 20. *Id.* at 4:3–10, 4:19–20, 4:32–33, 4:52. Figure 5 depicts basin 12 sandwiched between seal rings 22, 24, when housing 14 is mounted in basin 12. *Id.* at 4:7–16. Cap 32 includes water inlet opening 24 and three outlets 36. *Id.* at 4:54–58. Stator 26 receives rotor 28, which includes central bore 44 for receiving post 46 of housing 14. *Id.* at 4:25–29. When the motor is energized, rotor 28 and vanes 30 rotate, drawing water in through inlet 34, through spaces adjacent the interior of cap 32 and a portion of housing 14, and out through outlets 36. *Id.* at 4:33–36, 5:6–12. According to the '655 patent, the disclosed structure allows for quick and effective cleaning of the pump parts between users of a pedicure

chair, without the need to include piping systems that are difficult to clean. *Id.* at 1:63–67, 2:5–6, 5:51–53, 6:21–34.

D. Challenged Claims

Petitioner challenges all of the reissued claims of the '655 patent—claims 4–74. Of those, claims 4 and 15 are independent. Claim 4 is reproduced below.

> 4. A jet pump configured to be mounted in a basin of a pedicure chair or in a whirlpool bath wherein water is circulated, the jet pump comprising:
>
> a housing supporting a motor having a stator and a rotor and configured to rotatingly drive a plurality of vanes about an axis, the housing comprising a shoulder configured to mount the housing to a wall of the pedicure chair or whirlpool bath so that a housing front part extends into the basin;
>
> a cap having an outer surface and an inner surface, the cap releasably engaged with the housing front part so as to define a pump chamber between the cap inner surface and a surface of the housing front part, the cap comprising a plurality of spaced-apart holes formed through the cap and defining an inlet aligned with the axis, and an outlet opening through the cap inner surface, the outlet opening being radially spaced from the inlet;
>
> the plurality of vanes disposed within the pump chamber and rotatable by the rotor to draw water axially through the inlet and direct the water radially and out the outlet opening;
>
> the surface of the housing front part within the pump chamber comprising a flat portion and an outer portion, the outer portion extending in a direction transverse to the flat portion and terminating at an outer edge, the outer edge forming an unbroken circle, and when the cap is engaged with the housing front part the outer edge engages the cap inner surface and the outlet opening of the cap is adjacent the outer edge; and

> a first point along the cap inner surface being defined at the inlet, a second point along the cap inner surface being defined adjacent the outlet opening, the first point and second point being spaced radially and axially relative to one another.

Ex. 1001, 7:13–47 (italics omitted).

E. Asserted Grounds

Petitioner asserts that claims 4–74 are unpatentable on the following grounds (Pet. 2):

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
4–14, 24–30, 32–34, 36–48, 50–54	103(a)	Chang,[1] Laing '049[2]
15–23, 31, 35, 49, 55–74	103(a)	Chang, Laing '049, Laing '275[3]

Petitioner also relies on the Declaration of Dr. David Allan Hullender. Ex. 1009 ("Hullender Declaration"). Patent Owner deposed and cross-examined Dr. Hullender, and submits a transcript of the deposition. Ex. 2020.

Patent Owner relies on the Declaration of Dr. Michael Johnson (Ex. 2004) and the Second Declaration of Dr. Michael Johnson (Ex. 2021). Petitioner deposed and cross-examined Dr. Johnson, and submits a transcript of the deposition. Ex. 1025.

[1] U.S. Patent No. 6,836,908 B1, issued Jan. 4, 2005 (Ex. 1010) ("Chang").
[2] U.S. Patent No. 5,143,049, issued Sept. 1, 1992 (Ex. 1011) ("Laing '049").
[3] U.S. Patent No. 5,941,275, issued Aug. 24, 1999 (Ex. 1012) ("Laing '275").

ANALYSIS

A. Legal Standards

To prevail in its challenges, Petitioner must prove unpatentability by a preponderance of the evidence. 35 U.S.C. § 316(e) (2012); 37 C.F.R. § 42.1(d) (2018). "In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable." *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim")). This burden of persuasion never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burdens of proof in an *inter partes* review).

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person of ordinary skill in the art ("POSITA") to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

The level of skill in the art is "a prism or lens" through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). "The person of ordinary skill in the art is a hypothetical person who is presumed to have known the relevant art" at the time of the invention. *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). Factors that may be considered in determining the level of ordinary skill in the art include, but are not limited to, the types of problems encountered in the art, the sophistication of the technology, and educational level of active workers in the field. *Id.* In a given case, one or more factors may predominate. *Id.*

Petitioner contends that a person having ordinary skill in the art would have a "Bachelor's degree in mechanical engineering and/or some experience in connection with mechanical and electrical apparatuses and processes used in fluid pumps at the time." Pet. 3. Patent Owner agrees that one of ordinary skill in the art would have practical experience in pump design, and alleges that such experience includes familiarity "with the objectives of pump designs," such that the person "will understand that a pump should not be designed to be less efficient than it could be unless there is a compelling reason to do so." PO Resp. 5–6. Patent Owner also alleges that "[t]o that end, a POSITA would understand that a pump's objective is to get the pumped media through and out of the pump rather than maintaining the media within the pump." *Id.* at 6 (citing Ex. 2020, 24:8–13, 161:1–7; Ex. 2021 ¶ 2).

The parties' proposals do not differ in any respect that would suggest our determination on this issue would impact any of our findings in this

case. *See* Tr. 20:14–16 (Petitioner's counsel agreeing that the issues in this case do not turn on which proposal for the level of ordinary skill in the art that we adopt). Patent Owner does not take issue with Petitioner's proposal, but adds its own interpretations of what one of ordinary skill in the art would be "familiar with" and "understand" based on experience in pump design. *See* PO Resp. 5–6. Although Patent Owner's assertions may accurately depict the knowledge and understanding of such a person, those details need not be included in an assessment of the *level* of ordinary skill in the art focused on educational or experiential background in the art. Based on the full record before us, because the asserted references describe the problems and solutions of "mechanical and electrical apparatuses and processes used in fluid pumps" (Pet. 3), we adopt Petitioner's proposal, which is consistent with the prior art of record, and apply this definition in our analysis.

C. Claim Construction

In this *inter partes* review, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b) (2018); *Cuozzo Speed Techs. LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation standard).[4] We need only construe claim terms to the extent necessary to resolve the determinative issues in this *inter partes* review. *Vivid Techs., Inc. v. Am.*

[4] On October 11, 2018, the Office revised its rules to harmonize the Board's claim construction standard with that used in federal district court. Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (Oct. 11, 2018) (now codified at 37 C.F.R. pt. 42 (2019)). This rule change, however, applies to petitions filed on or after November 13, 2018, so the revised claim construction standard does not apply to this proceeding. *Id*.

Sci. & Eng'g, Inc., 200 F.3d 795, 803 (Fed. Cir. 1999) (construing explicitly only those claim terms in controversy and only to the extent necessary to resolve the controversy); *see also Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (applying *Vivid Techs.* in the context of an *inter partes* review).

Petitioner proposes constructions for several claim limitations. Pet. 8. Patent Owner "submits that the claim limitations are understandable in their current form in light of the disclosure and context" and "requests that the limitations be given their plain and ordinary meaning." PO Resp. 84. Patent Owner also provides alternative constructions for the claim limitations construed by Petitioner. *Id.* at 84–86.

Although both parties provide potential constructions for a number of claim terms, the parties agree that we need not construe any claim terms to resolve the issues in this case. PO Resp. 84; Tr. 20:3–9 (Petitioner's counsel stating, "I don't think we need any claim construction. I think they're pretty clear."). We determine that no express interpretation is required for any claim term.

D. Obviousness Based on Chang and Laing '049

Petitioner challenges claims 4–14, 24–30, 32–34, 36–48, and 50–54 under 35 U.S.C. § 103 as unpatentable over Chang and Laing '049. Pet. 2, 25–106. For these challenges, Petitioner cites to the asserted references and Dr. Hullender's testimony. *Id.* Patent Owner, relying on Dr. Johnson's testimony, contends that Petitioner's proposed combination of Chang and Laing '049 lacks an adequate foundation. PO Resp. 6–61. Patent Owner also contends that the combination fails to disclose all of the limitations of certain claims. *Id.* at 61–83.

1. Chang

Chang discloses a water circulation device that "offers a simple and inexpensive way to circulate water for a better sanitary effect." Ex. 1010, 1:6–9. Figures 1 and 3 of Chang are reproduced below.

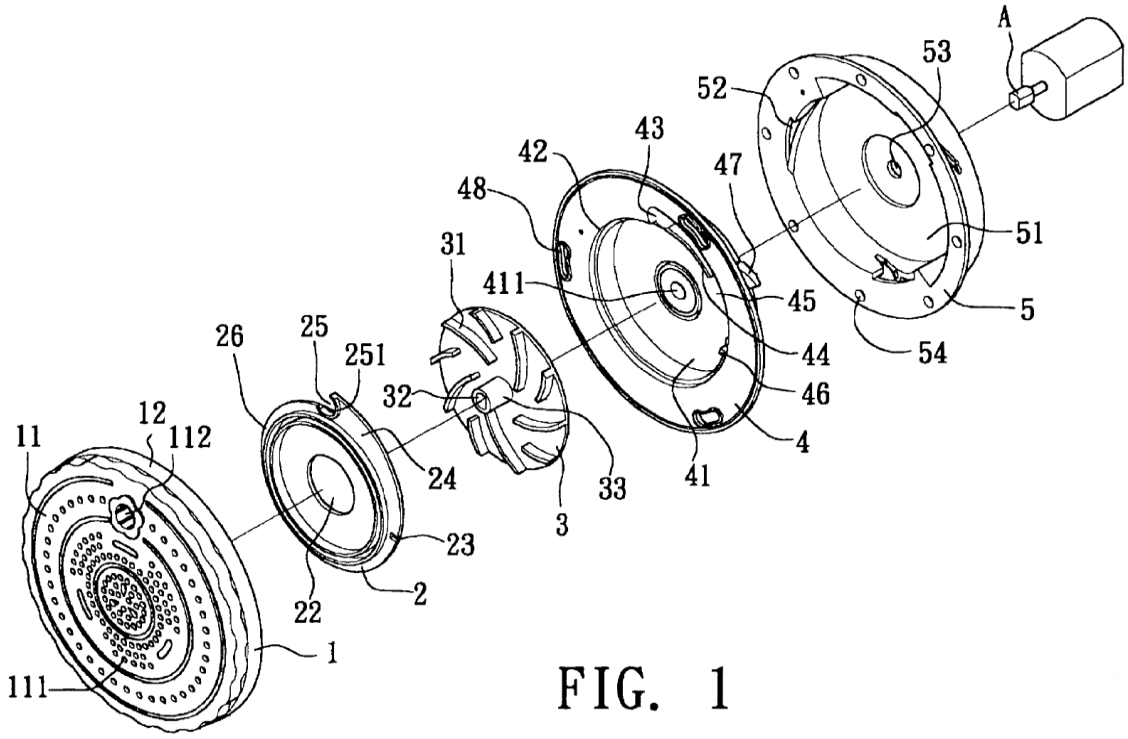

FIG. 1

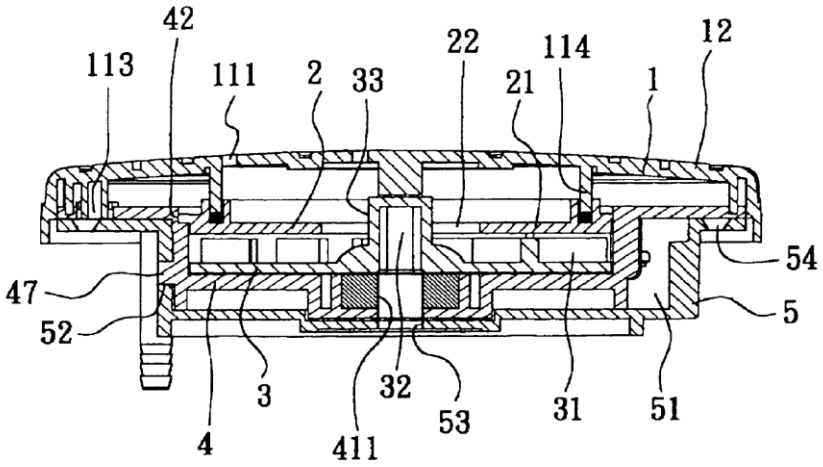

FIG. 3

Figure 1 is an assembly view of Chang's invention. Ex. 1010, 1:54. Figure 3 is a cross-sectional view of Chang's invention. *Id.* at 1:56–57. Figure 1 depicts, from left to right: hood 1 having water inlet holes 111 and water outlet hole 112; water outlet plate 2 with passing hole 22; revolving plate 3 with protruding stripes 31 and axis hole 32; container 4 with hole path 43; and back base 5 having base containing chamber 51 that contains container 4. *Id.* at 1:62–2:1, 2:10, 2:22–28, 2:34–35, 2:47–49. Axis A of a motor connects to axis hole 32 of revolving plate 3 so that as the motor rotates, revolving plate 3 and protruding stripes 31 rotate to draw water through inlet holes 111, through passing hole 22, to hole path 43 (via hole 45 in wall 44), and through water outlet hole 112. *Id.* at 2:34–37, 2:64–3:8. According to Chang, the disclosed structure avoids the use of pipes, which are difficult to clean, and provides for easier cleaning of the circulation device. *Id.* at 3:19–25.

2. Laing '049

Laing '049 relates "to a recirculation pump used to maintain a flow of hot water" in a distribution system that provides hot water from a water heater to various taps. Ex. 1011, 1:10–15, Figs. 1, 4. Figure 6 of Laing '049 is reproduced below.

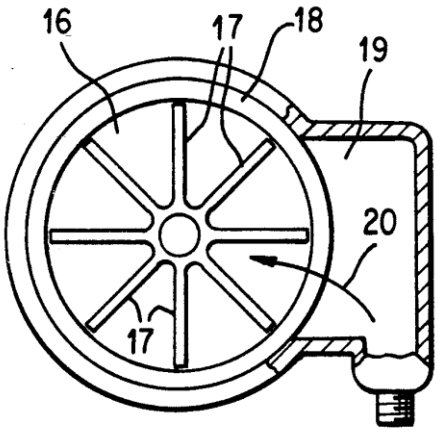

FIG. 6

Figure 6 is a front elevation view of Laing '049's recirculation pump. Ex. 1011, 2:13. Figure 6 depicts impeller 16 having linear vanes 17 surrounded by annular channel 18, and output port 19. *Id.* at 3:2–8. When compared to the prior art pump described by Laing '049, the disclosed pump: has a smaller diameter for impeller 16, creating a larger annular channel 18; includes linear rather than bent vanes; and has a larger output port 19. *Id.*; *see also id.* at Figs. 2, 3, 5, 6. Figure 6 also shows backflow 20 entering through outlet port 19 and moving toward impeller 16. *Id.* at 3:7–15. Figure 7 shows another design having enlarged annular channel 21 surrounding impeller 22, and enlarged outlet port 23. *Id.* at 3:15–19, Fig. 7. According to Laing '049, the changes in its design over the prior art—straight vanes, larger annular channel, and larger output port—lessen the effect of any backflow 20 to the point that the conventional check valve in the recirculation system can be eliminated. *Id.* at 2:59–62, 3:10–20, Figs. 1, 4. Laing '049 explains that the removal of the check valve allows for the use of a lower power pump, which compensates for any drop in efficiency

and throughput that the changes may introduce. *Id.* at 1:47–50, 2:59–68, 3:8–15.

3. Independent Claim 4

a) The Parties' Positions as to the Combination of Chang and Laing '049

Patent Owner focuses its argument as to claim 4 on the propriety of Petitioner's proposed combination. PO Resp. 6–61. We therefore focus on Petitioner's argument that one of ordinary skill in the art would have been motivated to modify Chang with Laing '049's teachings to arrive at the claimed invention.

Petitioner raises several arguments in support of its proposed modification of Chang in view of Laing '049. *See* Pet. 25–49. First, Petitioner stresses the known water flow through Chang; the allegedly similar technology disclosed by Chang, Laing '049, and the '655 patent; and the alleged commonality of configurations of Chang and Laing '049. *Id.* at 25–34. Petitioner then turns to two teachings of Laing '049 that Petitioner argues provides lower power consumption and improved flow, such that one of ordinary skill in the art would have been motivated to apply those teachings to Chang. *Id.* at 34–39. The first teaching involves enlarging the annular space surrounding the impeller vanes. *Id.* at 34–36 (citing Ex. 1009 ¶¶ 117–121; Ex. 1011, 1:53–63, 3:1–7, 3:15–20, Figs. 3, 6, 7). The second teaching involves replacing an "outlet slot axially aligned to vane ends with straight-wall annular channel to outlet." *Id.* at 37–39 (emphasis omitted) (citing Ex. 1009 ¶¶ 122–125; Ex. 1011, Figs. 2, 3, 5–7). Petitioner contends that the straight-wall annular channel to the outlet results from enlarging Laing '049's outlet port 23 and moving it axially away from impeller 22, as

shown in Figure 7, "such that the outlet is no longer axially aligned to the impeller vanes." *Id.* at 37 (citing Ex. 1009 ¶ 122).

Petitioner argues that one of ordinary skill in the art would have been motivated to implement Laing '049's first and second teachings in Chang to reduce power consumption and improve flow. Pet. 39–40 (citing Ex. 1009 ¶¶ 126–127). Petitioner also asserts that after implementing changes based on Laing '049's flow path, "the POSITA will know that the holes 45 and 43 of Chang are not needed and can be closed" and "flow through the chamber 51 of Chang is not needed." *Id.* at 40 (citing Ex. 1009 ¶ 127). Petitioner sets forth how it proposes to modify Chang with Laing '049's teachings, including alterations of Chang's flow path based on Laing '049's teachings. *Id.* at 39–49 (citing Ex. 1009 ¶¶ 126–137; Ex. 1010, 2:22–28, Fig. 3; Ex. 1011, Fig. 7). For example, Petitioner contends that by enlarging the annular space surrounding the impeller vanes as taught by Laing '049's first teaching, Chang's "[c]hamber 51 is not needed; thus holes 43 and 45 are not needed" and are eliminated from Chang. *Id.* at 45 (citing Ex. 1009 ¶ 133), 67 (citing Ex. 1009 ¶¶ 174–177) ("A POSITA would be motivated to remove the holes 43 and 45 . . . because implementing the teachings of Laing-049 to enlarge the annular channel would allow water to flow from the impeller vanes (revolving plate 3) along the housing front part (blue surface) directly to one or more outlets 112 in the hood 1."). According to Petitioner, the combination allegedly results in "an improved water circulation pump . . . having better flow characteristics and reduced energy consumption" without changing Chang's principle of operation. *Id.* at 48–49 (citing Ex. 1009 ¶¶ 136–137).

Patent Owner raises numerous arguments against Petitioner's proposed combination, supporting each argument with testimony of its declarant, Dr. Johnson. PO Resp. 6–61. As relevant here, Patent Owner argues that Chang and Laing '049 are directed to different purposes because Chang operates in an environment that avoids the use of pipes, whereas Laing '049 discloses a pump in a hot water piping system with a risk of backflow and a check valve to limit backflow. *Id.* at 19 (citing Ex. 1010, 1:42–46, 2:62–66; Ex. 1011, 2:54–58; Ex. 2004 ¶ 121). According to Patent Owner, there is no reason to incorporate Laing '049's changes that address backflow issues into Chang, which has no risk of backflow. *Id.* (citing Ex. 2004 ¶ 121). More specifically, Patent Owner contends that Laing '049's changes only make sense in the context of removing Laing '049's check valve and its related power consumption advantages due to the smaller motor that can be used in a system without a check valve. *Id.* at 20–21 (citing Ex. 1011, 1:20–22, 1:39–44, 1:47–50; Ex. 2004 ¶ 77). Patent Owner further argues that Petitioner's declarant, Dr. Hullender, fails to support his opinion that the proposed changes based on Laing '049 would either reduce power consumption of the pump or improve flow. *See, e.g.*, *id.* at 21–34. Patent Owner contends that increasing the annular channel around the impeller would only increase recirculation and reduce efficiency, and there is no rational basis for making such negative changes to Chang. *Id.* at 27 (citing Ex. 2004 ¶ 104), 33–34.

Patent Owner also argues that Petitioner misinterprets Chang by claiming that Chang employs unnecessary flow through chamber 51 via a hole in a wall, and that one would have been motivated to incorporate the modifications to improve flow by removing such flow restrictions within

Chang. PO Resp. 35–38 (citing Ex. 1009 ¶¶ 108, 153; Ex. 2020, 93:17–21, 96:9–13, 105:5–9, 108:2–109:12, 172:17–173:1, 216:5–11, 233:3–17, 241:13–243:2). According to Patent Owner, "[n]o POSITA would intentionally place such a hole through the side wall of a volute" to create flow in Chang's chamber 51, and Chang itself suggests eliminating back base 5 and chamber 51, which underscores the lack of flow through chamber 51. *Id.* at 38–39 (citing Ex. 2021 ¶¶ 11, 17), 40 (citing Ex. 1010, 2:62–3:8; Ex. 2021 ¶ 14). Patent Owner argues that Petitioner's reliance on "improved flow" due to removal of the nonexistent flow in chamber 51 undermines the basis for Petitioner's proposed combination. *Id.* at 39–40. Patent Owner also argues that Petitioner's proposed modifications improperly remove Chang's hole path 43 (i.e., "volute structure"), rendering the modified Chang unsuitable for its intended purpose. *Id.* at 49–50.

In its Reply, Petitioner argues that Patent Owner misconstrues Laing '049's first teaching by not acknowledging that the teaching includes enlarging the annular channel and enlarging the outlet port. Pet. Reply 16, 19. As to flow of water through chamber 51, Petitioner argues that "there is no reason the pump chamber does not have fluid in space 51" because Patent Owner's declarant, Dr. Johnson, agreed that some fluid could leak into the space. *Id.* at 25–26 (citing Ex. 1025, 260:11–260:17).

In its Sur-reply, Patent Owner maintains that because Chang's pump is mounted directly on the wall of a spa, unlike the piped system of Laing '049, there is no reason to modify Chang to limit the effect of backflow as in Laing '049. PO Sur-reply 16 (citing Ex. 2004 ¶ 121). Patent Owner also argues that Chang's design is not intended to flow into chamber 51 of back plate 5, even if there was potential for some water to leak into chamber 51.

Id. at 17–18 (citing Ex. 1009 ¶ 153; Pet. Reply 24–26). Patent Owner contends that both of these points were conceded by Petitioner. *Id.* at 16–17. Patent Owner contends that Petitioner's mistaken belief that hole 45 opens to chamber 51 and causes unwanted flow undermines its argument that the modifications to Chang will improve flow by eliminating such flow. *Id.* at 18–20 (citing Ex. 2020, 105:5–9, 172:17–20, 216:2–11; Pet. Reply 27; PO Resp. 35–42).

b) Discussion

Petitioner's argument that one of ordinary skill in the art would have been motivated to modify Chang's flow path based on Laing '049's first and second teachings rests on the premise that Laing '049 correlates the first and second teachings with lower power requirements and improved flow. Pet. 34–39 (describing Laing '049's first and second teachings), 39–49 (applying Laing '049's teachings to Chang to produce a modified version of Chang). Petitioner's arguments and Dr. Hullender's testimony are not persuasive because they fail to address adequately the context in which Laing '049 made its changes.

Laing '049 makes clear that the power reduction and improved flow relates to the context of the overall system of Laing '049, not the pump itself. Laing '049 addresses problems in a hot water distribution system, i.e., delivering hot water through pipes in a dwelling. *See* Ex. 1011, 1:10–15, Figs. 1, 4. The prior art system that Laing '049 seeks to improve upon included a check valve to protect against backflow in the system, which required increasing the pump power from "approximately 10 watts" to "35 to 50 watts in order to overcome the resistance of the check valve." *Id.* at 1:21–46. Laing '049 seeks to improve the pump in such a way that the

system does not require a check valve to protect against backflow, which would, in turn, allow for the use of a lower power pump. *Id.* at 1:47–50; *see also id.* at 1:53–63 (describing objects of the invention as to provide a low power pump "immune to damage due to backflow" and "to limit the energy consumption of a hot water distribution system"). Laing '049 makes clear that the elimination of the check valve provides the power savings in the system, not any changes within the pump, stating:

> The check valve 7 eliminates any chance of backflow. It should be understood that if the effect of backflow could be reduced, and the check valve 7 eliminated, the power of the recirculation pump 5 could be reduced to approximately 10 watts for a typical domestic hot water installation. This will result in a substantial power saving over time.

Id. at 2:58–64.

As noted above in the overview of Laing '049, Laing '049 makes three changes to the prior art pump that it describes in an effort to reduce the effect of backflow—straightened vanes, a larger annular channel, and a larger output port. *Id.* at 3:10–20. These changes allow for the elimination of the check valve in the prior art system, which, in turn, allows for the use of a lower power pump. *Id.* at 1:64–68, 2:59–62. Laing '049 notes that the changes to the pump standing alone "may result in a drop of efficiency and throughput," but these disadvantages are outweighed by the lower impact of backflow and the ability to remove the check valve from the system, leading to the lower power pump. *Id.*; *see also id.* at 1:47–50, 2:62–68, 3:8–15.

Based on the foregoing, we find that Laing '049 teaches power savings by using a pump less impacted by backflow, which allows for the use of a lower power pump. Laing '049 was not touting the changes in the pump itself as leading to power savings, as Petitioner contends. As to

improved flow, to the extent that Laing '049 provides any teaching of "improved" flow, it relates to the elimination of backflow problems, as discussed above. Laing '049 does not suggest that its design improves flow through the pump itself. To the contrary, Laing '049 states that the disclosed changes within the pump will decrease efficiency and throughput, which are offset by the absence of the backflow and check valve issues addressed by Laing '049. *See* Ex. 1011, 3:8–10. As a whole, Laing '049 does not suggest that its changes to the pump, while providing advantages within Laing '049's system, would provide any advantages in a pipeless system, such as Chang's, without any check valve or backflow concerns. *See* Tr. 7:19–21 (Petitioner's counsel acknowledging that Chang does not include check valve or backflow concerns).

Petitioner contends that Laing '049 teaches using a smaller impeller, which will decrease power requirements. *See* Pet. 39. There is no dispute that smaller impellers require somewhat less power to operate, but Petitioner has made no attempt to quantify the amount of such power savings or weigh it against competing concerns such as lower efficiency and throughput. *Id.* Moreover, we do not read Laing '049 as suggesting that the reduced impeller size results in any meaningful reduction in power requirements—it says nothing about power reduction in relation to impeller size. Ex. 1011, 3:4–15. Instead, the only advantage that Laing '049 mentions as to the reduced impeller size is the larger annular channel it creates, which renders the impeller less susceptible to backflow, but also less efficient and with less throughput. *Id.* To the extent that it is possible that the power-saving benefit of a smaller impeller outweighs the drawbacks of lower efficiency and throughout noted in Laing '049, Petitioner does not explain adequately

how the smaller impeller outweighs those disadvantages, with adequate explanation or support in the record. *See* Pet. 34–49.

Petitioner also contends that Laing '049's Figure 7 depicts an improved flow path. Pet. 36–39. Figure 7 shows a side view of the modified pump impeller and flow path. Ex. 1011, Fig. 7. Laing '049 describes Figure 7 after first noting the three changes to the prior art pump and the improved resistance to backflow: "As illustrated in FIG. 7, the annular channel 21 surrounding the impeller 22 and the output port 23 have much enlarged cross-sections compared to the annular channel and output port illustrated in FIG. 1 of U.S. Pat. No. 3,803,432." *Id.* at 3:15–20. This single sentence of description does not address any improved flow from use of this design. In the context of the paragraph in which the sentence appears, the only potential improved flow would be the resistance to backflow, and the actual flow out of the pump, or "throughput," would be negatively impacted by the use of the larger annular channel shown in Figure 7. *See id.* at 3:3–15.

Although not explained by Laing '049, Petitioner touts the flow of water from impeller 22 from the annular channel to output port 23, shown in Figure 7, as an improvement over Chang's existing flow path. Pet. 38. This argument lacks adequate explanation and support, as water leaving impeller 22 would need to take one 90 degree turn at the wall forming the outside of annular space 21, then another 90 degree turn into outlet port 23. *See id.* (depicting annotated Fig. 7); Ex. 1011, Fig. 7. Chang's existing flow out of the impeller appears more straightforward by entering hole path 43 via hole 45, on an arc tangential to the impeller, before making a single 90 degree turn to outlet 112. *See* Ex. 1010, Figs. 1, 2, 4. Even if there were some

potential benefits due to these proposed changes, Petitioner has not adequately explained, with support from evidence in the record, how its proposed modifications to Chang would improve Chang's performance in a manner that outweighs the drop in efficiency and throughput inherent in the design changes introduced by Laing '049.

Given Laing '049's description of its changes as causing reduced efficiency and throughput in the pump, and the advantages as limited to the check valve/backflow context not present in Chang, it was incumbent upon Petitioner to do more than assume that Laing '049's alleged advantages would apply to Chang. As noted above, to the extent there were advantages in power savings or improved flow inherent in Laing '049's design, Petitioner must show those advantages outweighed the disadvantages expressly noted by Laing '049 in its approach, in a system, such as Chang's, without any check valve or backflow issues. Instead, the Petition largely ignores the context of Laing '049 and the reasons why making changes deleterious to the pump's efficiency and throughput nevertheless made sense in Laing '049 due to elimination of the check valve and improved resistance to backflow. Moreover, Petitioner's declarant, Dr. Hullender, does not provide the analysis the Petition lacks, as the relevant portions of the Hullender Declaration are nearly word-for-word identical to the Petition and lack citation to authority beyond Laing '049 that would support Petitioner's positions. *See, e.g.*, Pet. 34–49; Ex. 1009 ¶¶ 117–137. Patent Owner provides more persuasive argument and evidence on these issues, as summarized above. We also credit the testimony of Dr. Johnson over that of Dr. Hullender because Dr. Johnson's testimony finds support in the references. *See, e.g.*, Ex. 2004 ¶¶ 77–78, 86–104 (describing Laing '049),

105–114 (addressing Dr. Hullender's incorrect reading of Laing '049), 115–129 (addressing the proposed modifications of Chang based on Laing '049).

Petitioner raises one argument that is arguably independent of Laing '049, although based on the flow described in Figure 7 of Laing '049. Petitioner argues that the proposed modifications to Chang will improve flow in Chang because hole path 43 and hole 45 can be eliminated, as well as flow through chamber 51. *See* Pet. 40, 45. We agree with Patent Owner, however, that Petitioner's argument lacks an adequate foundation in Chang. *See* PO Resp. 35–40 (citing Ex. 1009 ¶¶ 108, 153; Ex. 1010, 2:62–3:8; Ex. 2020, 93:17–21, 96:9–13, 105:5–9, 108:2–109:12, 172:17–173:1, 216:5–11, 233:3–17, 241:13–243:2; Ex. 2021 ¶¶ 11, 14, 17). Chang does not state that water flows via a hole into chamber 51, and strongly suggests that no flow through chamber 51 was intended because Chang contemplates removing back base 5. *See* Ex. 1010, 2:67–3:2. With back base 5 removed, any flow into chamber 51 would escape from the pump, severely compromising the operation of Chang. *See* Ex. 2021 ¶¶ 11–17; Ex. 2020, 98:6–102:1 (Dr. Hullender unable to make sense of how removing back base 5 in Chang would work). Chang itself appears to undermine Petitioner's assertion that Chang could be improved by eliminating flow through chamber 51, because that flow does not exist. At oral argument, Petitioner indicated that it "basically . . . retracted" this argument, stating that it "do[es]n't know" whether Chang's structure is open to chamber 51, and "can't tell" whether there is flow in chamber 51. Tr. 27:7–28:17. If Chang does not teach flow in chamber 51, then removing such allegedly unwanted flow cannot provide an advantage and a reason to modify Chang. Even if Petitioner had not effectively retracted the argument at oral argument, we are not persuaded

that the elimination of any alleged flow in Chang's chamber 51 provides a reason to modify Chang's flow path.

Based on the foregoing, Petitioner does not provide sufficient argument and evidence to establish, by a preponderance of the evidence, that one of ordinary skill in the art would have been motivated to modify Chang based on Laing '049's teachings, in a manner that results in a modified device meeting all of the limitations of claim 4. Because the modified version of Chang based on Laing '049 provides the premise for Petitioner's assertion that all of the limitations of claim 4 are disclosed by the combination of Chang and Laing '049, the lack of support for Petitioner's proposed combination fatally undermines Petitioner's obviousness challenge. *See* Pet. 50–72 (relying on the proposed combination of Chang and Laing '049 in the context of assertions as to claim 4).

4. Conclusion

"Once all relevant facts are found, the ultimate legal determination [of obviousness] involves weighing of the fact findings to conclude whether the claimed combination would have been obvious to an ordinary artisan." *Arctic Cat Inc. v. Bombardier Recreational Prods. Inc.*, 876 F.3d 1350, 1361 (Fed. Cir. 2017) (quoting *In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*, 676 F.3d 1063, 1068–69 (Fed. Cir. 2012)). Above, based on full record before us, we consider the evidence regarding (1) the level of ordinary skill in the art, (2) the scope and content of the prior art, and (3) any differences between the claimed subject matter and the prior art.[5]

[5] Neither party addresses the presence or absence of any objective indicia of nonobviousness, the fourth *Graham* factor.

Weighing these underlying factual determinations, Petitioner has failed to establish, by a preponderance of the evidence, that the subject matter of claim 4 would have been obvious over Chang and Laing '049. Petitioner's challenge to dependent claims 5–14, 24–30, 32–34, 36–48, and 50–54 relies on the same flawed rationale for combining Chang and Laing '049. Pet. 73–106. Those dependent claims have not been shown to be unpatentable for the same reasons.

E. Obviousness Based on Chang, Laing '049, and Laing '275

Petitioner challenges claims 15–23, 31, 35, 49, and 55–74 under 35 U.S.C. § 103 as unpatentable over Chang, Laing '049, and Laing '275. Pet. 107–123. For these challenges, Petitioner cites to the asserted references and declarant testimony. *Id.* Claim 15 is the only independent claim challenged on this basis. *Id.* at 108.

Laing '275 relates to "a hot water distribution system incorporating a pump." Ex. 1012, 1:7–8. Petitioner contends that one of ordinary skill in the art would have further modified the proposed Chang/Laing '049 combination with the teachings of Laing '275. Pet. 107 (citing Ex. 1009 ¶ 188). Petitioner's challenge based on Chang, Laing '049, and Laing '275 expressly relies on the combination of Chang and Laing '049 that Petitioner proposes in the context of the previous challenge based on Chang and Laing '049. *See id.* ("For the reasons discussed herein in Section VI.A., a POSITA would know of Laing-049 and be motivated to combine the teachings of Laing-049 with Chang to produce a modified water circulation pump having improved characteristics." (citing Ex. 1009 ¶ 188)); *see also id.* at 108–17 (relying on analysis for claim 4 for many of the limitations of claim 15). Patent Owner's arguments against the combination of Chang and Laing '049

apply equally to this challenge that relies on the same combination with the same rationale.

For the reasons discussed above in the context of claim 4, Petitioner has failed to establish that one of ordinary skill in the art would have been motived to modify Chang using Laing '049's teachings in the manner proposed by Petitioner. Weighing the underlying factual determinations, Petitioner has failed to establish, by a preponderance of the evidence, that claim 15 would have been obvious over Chang, Laing '049, and Laing '275. Petitioner's challenge to dependent claims 16–23, 31, 35, 49, and 55–74 relies on the same flawed rationale for combining Chang and Laing '049. Pet. 107, 118–123. Those dependent claims have not been shown to be unpatentable for the same reasons.

CONCLUSION[6]

In summary:

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
4–14, 24–30, 32–34, 36–48, 50–54	103	Chang, Laing '049		4–14, 24–30, 32–34, 36–48, 50–54
15–23, 31, 35, 49, 55–74	103	Chang, Laing '049, Laing '275		15–23, 31, 35, 49, 55–74
Overall Outcome				4–74

ORDER

In consideration of the foregoing, it is hereby:

ORDERED that none of claims 4–74 of U.S. Patent No. RE46,655 E have been shown to be unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

[6] Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding.* *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

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Patent RE46,655 E

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